

**What is claim d is:**

1. A motor control apparatus for driving, by means of a power converter such as inverter, a synchronous motor such as brushless motor not provided with a sensor for detecting a motor  
5 axis position, comprising:

phase current detecting means for detecting phase currents to the synchronous motor;

current phase calculating means for calculating a current phase based on the phase currents detected by said phase current  
10 detecting means;

voltage phase setting means for setting a voltage phase that is determined by adding a predetermined phase difference to the current phase calculated by said current phase calculating means;

command voltage determining means for determining a command  
15 voltage based on a rotational speed command; and

phase voltage setting means for setting phase voltages to the synchronous motor based on the voltage phase set by said voltage phase setting means and the command voltage determined by said command voltage determining means.

20 2. The motor control apparatus according to claim 1, further comprising:

current peak value calculating means for calculating a motor current peak value based on the phase currents detected by said phase current detecting means;

25 angular velocity calculating means for calculating an angular velocity based on the current phase calculated by said current phase calculating means; and

phase difference calculating means for calculating a target current phase lead angle based on the motor current peak value  
30 calculated by said current peak value calculating means and the angular velocity calculated by said angular velocity calculating means, and for calculating a phase difference based on the current phase lead angle,

wherein said phase setting means performs a calculation in

which the phase difference calculated by said phase difference calculating means is added to the current phase calculated by said current phase calculating means to thereby calculate the current phase.

5           3. The motor control apparatus according to claim 1, further comprising:

          current peak value calculating means for calculating a motor current peak value based on the phase currents detected by said phase current detecting means;

10           angular velocity calculating means for calculating an angular velocity based on the current phase calculated by said current phase calculating means; and

          phase difference calculating means for selecting an angular velocity, using as parameters the motor current peak value calculated by said current peak value calculating means and the angular velocity calculated by said angular velocity calculating means, from a phase difference data table prepared beforehand,

15           wherein said voltage phase setting means performs a calculation in which the phase difference calculated by said phase difference calculating means is added to the current phase calculated by said current phase calculating means to thereby calculate the voltage phase.

20           4. The motor control apparatus according to claim 2 or 3, wherein said command voltage determining means causes the angular velocity calculated by said angular velocity calculating means to be fed back to an angular velocity specified by the rotational speed command, to thereby calculate the command voltage.

          5. The motor control apparatus according to claim 2 or 3, further comprising:

30           maximum voltage value limiting means for limiting an output voltage based on the motor current peak value calculated by said current peak value calculating means.

          6. The motor control apparatus according to claim 4, further comprising:

maximum voltage value limiting means for limiting an output voltage based on the motor current peak value calculated by said current peak value calculating means.